

"Mathematical design optimization of wide-field x-ray telescopes: mirror nodal positions and detector tilts"

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"We describe a mathematical formalism for determining the mirror shell nodal positions and detector tilts that optimize the spatial resolution averaged over a field-of-view for a nested x-ray telescope, assuming known mirror segment surface prescriptions and known detector focal surface. The results are expressed in terms of ensemble averages over variable combinations of the ray positions and wavevectors in the flat focal plane intersecting the optical axis at the nominal on-axis focus, which can be determined by Monte-Carlo ray traces of the individual mirror shells. This work is part of our continuing efforts to provide analytical tools to aid in the design process for wide-field survey x-ray astronomy missions."